

**19th International ACS/IEEE International Conference
on Computer Systems and Applications
AICSSA 2022
December 5-7, 2022**

**Hosted by Zayed University, Abu Dhabi
December 5-7, 2022**



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Message from AICCSA'2022 General Co-Chairs

With great pleasure we welcome all the delegates to the 19th IEEE Conference on Computer Systems and Applications (AICCSA'2022) that was held on the campus of Zayed University in Abu-Dhabi, UAE from December 5 to 7, 2022. The essence of AICCSA in computer systems research remains strong, healthy, and vibrant, with an acceptance rate of 42%. AICCSA'2022 IEEE proceedings will publish the accepted authors' works on Xplore following the conference. AICCSA uses a double-blind review process whereby each submission undergoes a rigorous review process. The breadth of topics in the submitted papers reflects the scope of areas in which computer systems evolve.

We sincerely thank the Program Track Co-Chairs, Rima Grati and Cihan Tunc, for making the 19th edition of AICCSA successful and memorable with their energy, passion, and commitment.

The conference offers keynotes. We warmly thank the keynote speakers: Manish Parashar, University of Utah, USA, Hoda H Alkhzaimi, New York University Abu Dhabi, Fakhri Karray, Mohamed bin Zayed University of Artificial Intelligence, University of Waterloo and Athena Vakali, Aristotle University of Thessaloniki, Greece for having accepted to deliver talks and look forward to hearing their perspectives on the state and future of computer systems research.

Organizing an international conference such as AICCSA requires the support of many volunteers. Hence, we would like to thank the local organization committee members, Rima Grati, Zakaria Maamar, Ons AL-Shamaileh, Emad Bataineh and Hanene Ben-Abdallah, who put tremendous efforts into making AICCSA'2022 successful and preparing a refreshing social program. We would also like to thank the financial support of the College of Technological Innovation and Research Office of Zayed University, UAE.

We would like to express our gratitude to the different track chairs, Sunil Arya, Nadjia Benblidia, Jorge Bernal Bernabe, Khoulood Boukadi, Aura Conci, Gianpiero Costantino, Ali Jaoua, Ilaria Matteucci, Nanjangud Narendra, Mohamed Reda Bouadjenek, Sana Sellami, Nasredine Semmar, and Sami Yangui, who tirelessly worked hard to ensure a timely and rigorous review process.

AICCSA has a strong tradition of nurturing and growing workshops and elevating them successfully to IEEE-sponsored conferences. This year in the same spirit, we are pleased to welcome the International Workshop on Health Informatics: IT Innovations and Disruptive Approaches in the Digital Health Era (HOPE'2022), the International Workshop on Artificial Intelligence for Cybersecurity (AICS'2022), and the Federated Systems & Testbeds Workshop on 5G and Beyond (FSW5G'2022). We are incredibly excited about having another successful edition of the PhD Forum with discussion and mentoring sessions to guide young scientists in planning their academic careers. We are also delighted to include the Symposium of Computing, Informatics, Multimedia, and Networking (CIMN) in the conference.

For the fifth time, AICCSA program includes a W-STEM (Women in STEM - science, technology, engineering, and mathematics) session where three prominent female professionals from academia and industry (Boran Al Tall, May al Tae, and Hoda A. Alkhzaimi) share their thoughts about the role of women in STEM. This year's W-STEM session also includes a panel to discuss *the participation rate of women in promising trends like data science, artificial intelligence or blockchain and figure out whether women are getting their part of the pie*. W-STEM session aims to promote discussion on gender issues, crucial role of women in significant advances in computing, and importance of women scientists in the evolution of science.

We want to thank our workshops and PhD forum organizers, Ali Akoglu, Bacem Mbarek, and Genoveva Vargas-Solar, for their diligent work and help with strengthening the program of the conference. We are grateful to the Publicity Chairs, Mohammed Al-Khafajiy, Mohamed El-Hadedy, Yaser Jararweh, and Yufei Sun, and for reaching out to the community and advertising the event on an international scale.

We want to extend a special thanks to Rima Grati and Cihan Tunc for their active role in different scientific and organization tasks such as Registration, Finance, and Publication. We thank them for setting up the core utilities for AICCSA, such as EasyChair, and forming a bridge to the IEEE Conference Publishing Services by monitoring the registration and paper verification process. We would also like to thank their essential role as Web chairs, ensuring that AICCSA audience has the most up-to-date information through the website and other social media.

Finally, we would like to thank the authors for contributing to the high-quality program, the program committee for their hard work in reviewing and selecting the papers, and the attendees for their participation and interest. This conference would not be a success without the support of the IEEE. We hope that you will enjoy the 19th edition of AICCSA in Abu-Dhabi.

AICCSA'2022 General Co-Chairs

Genoveva Vargas-Solar, CNRS, France

Zakaria Maamar, Zayed University, UAE

Message from AICCSA'2022 Program Co-Chairs

Warm welcome to the 19th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA'2022), organized from December 5-7, 2022 in Zayed University – Abu Dhabi, United Arab Emirates. As co-chairs of the Program Committee (PC), we are delighted to introduce this year's technical program and proceedings of AICCSA'2022.

AICCSA'2022, in collaboration with IEEE, continues its mission of covering trendy areas in computer systems and applications and providing the latest results on theory, design, analysis, implementation, and application in the dynamic domain of computer systems. In this year's edition, the main conference program is organized in seven technical sessions, for which the technical committee selected high-quality papers: 1) Ubiquitous, Parallel and Distributed Computing (including cloud, IoT, network, sensors, blockchain technologies), 2) Security, Privacy, and Trust, 3) Data Science, knowledge engineering, and ontologies (including Information Retrieval, Big Data, Databases, and Knowledge Systems), 4) Artificial Intelligence & Cognitive Systems, 5) Natural Language Processing, and 6) Multimedia, Computer Vision, and Image Processing.

The conference and satellite events including workshops and symposium attracted 119 submissions from authors in 31 countries. From these submissions, 93 were submitted to the main conference and 26 to satellite events. The evaluation of these papers consisted of a double-blind peer review process, where each paper was evaluated by three reviewers, followed by PC and Steering Committee discussions. As a result, the main conference accepted 39 regular papers for publication with a 42% acceptance rate.

We emphatically acknowledge the PC members and reviewers for their hard work, the insightful paper reviews, and discussions.

AICCSA'2022's satellite events are:

- 5th International Workshop on Health Informatics: IT Innovations and Disruptive Approaches in the Digital Health Era (HOPE'2022)
- International Workshop on Artificial Intelligence for Cybersecurity (AICS'2022)
- The Federated Systems & Testbeds Workshop on 5G and Beyond (FSW5G 2022)
- Symposium of Computing, Informatics, Multimedia, and Networking (CIMN)

A total of 48 papers from the total submissions were selected to be presented in these satellite events. The selection followed the same double-blind process as the papers for the main event. We also held a PhD forum with four short/abstract papers.

Finally, the AICCSA community is aware of the importance of discussing and promoting the role of women in computer science in STEM disciplines. Therefore, the program has included a W-STEM session where prominent female professionals from academia and industry presented keynotes and panel short interventions on their research and development projects and their professional experience.

We thank the conference steering committee, the general chairs, the organizing committee, the registration committee, the finance committee, and the publicity chairs for their help when putting together this technical program. We also thank track chairs as well as the program committee of each track who worked with the PC in paper reviews. Finally, we want to express our gratitude to all authors for choosing AICCSA as a venue for their work.

AICCSA'2022 Program Co-Chairs

Rima Grati, Zayed University, UAE

Cihan Tunc, University of North Texas, USA

Detailed program

December 5, 2022 - Monday	
9:30-10:00	Opening Ceremony (Liwa Arena room)
10:00-11:00	Liwa Arena room Keynote speaker 1: Manish Parashar, University of Utah, USA Topic: Data-Management for Extreme Science: Experiences in Translational Computer Science Research Chair: Salim Hariri, University of Arizona, USA
11:00-11:30	Coffee break
11:30-13:00 (concurrent sessions)	Workshop 1, Gatoof room: International Workshop on Health Informatics: IT Innovations and Disruptive Approaches in the Digital Health Era (HOPE'22) Chairs - Thomas Lux, Niederrhein University of Applied Sciences, Germany <u>Presenters, Titles</u> - Radi Jarrar, <i>Automated Learning Approach For Genetic Diseases</i> - Elyes Lamine, <i>Towards a novel spontaneous medication error reporting tool for enhancing patient safety</i> - Lea Leeser, Lisanne Kremer, Thomas Lux, <i>Process optimization of a pre-medication process in inpatient hospital care with 2D- and 3D-modeling software an as-is process to-be process comparison</i> - Abdallah Karakra, <i>Digital Twin in Healthcare: Security Threat Meta-Model</i> - Hasnae Zerouaoui, <i>Evaluating Interpretability of Multilayer Perceptron and Support Vector Machines for Breast Cancer Classification</i>
	Workshop 2, Araada room: International Workshop on Artificial Intelligence for Cybersecurity (AICS'22) Chair: Sanaa Kaddoura, Zayed University, UAE <u>Presenters, Titles</u> - Souheir Merkouche, <i>A Hybrid approach for containerized Microservices Auto-scaling</i> - Natasha Alkhatib, <i>CAN-BERT do it? Controller Area Network Intrusion Detection System Based on BERT Language Model</i> - Oussama Hamid, <i>There Is More to AI than Meets the Eye: Aligning Man-made Algorithms with Nature-inspired Mechanisms</i> - Hamda Al Breiki, <i>Trust Evolution Game in Blockchain</i>
	Workshop 3, Liwa Arena room: The Federated Systems & Testbeds Workshop on 5G and Beyond (FSW5G 2022) Chairs: Hisham Kholidy, State University of New York, USA Keynote: Juan Bennett, FAU, USA <u>Presenters, Titles</u> - Jesus Pacheco, <i>AI Classifiers Comparison for Network Anomaly Behavior Analysis</i> - Abdul Manan, <i>Extending 5G services with Zero Trust security pillars: a modular approach</i> - Salim Hariri, <i>Blockchain Based Methodology for Zero Trust Modeling and Quantification for 5G Networks</i>

<p>11:30-17:30</p>	<p>PhD forum (Hybrid), Marwan room</p> <p>Chairs</p> <ul style="list-style-type: none"> • Ali Akoglu, University of Arizona, USA • Geneveva Vargas Solar, CNRS-LIRIS, France • Bacem Mbarek, Masaryk University, Czechia <p>Motivational talk and discussions <i>Preparing your professional career, when to start? Which are the right questions to ask?</i> Geneveva Vargas Solar, CNRS-LIRIS, France</p> <p><u>Papers and mentoring session</u></p> <ul style="list-style-type: none"> - Bilel Elayeb, <i>Arabic Text Summarization and Classification Based on Analogical Proportions</i> - Eiman Alothali, <i>Using Self-labeling and Co-Training to Enhance Bots Labeling in Twitter</i> - Ahmed Alia, <i>A Fast Hybrid Deep Neural Network Model for pushing behavior detection in human crowds</i> - Basmah Al-Zahrani, <i>Property Graph Access Control Using View-Based and Query-Rewriting Approaches</i> - Gcinizwe Dlamini, <i>Towards understanding the impact of mental states on software development using EEG</i>
<p>Lunch (Liwa Arena room)</p>	
<p>14:00-15:30 (concurrent sessions)</p>	<p>Workshop 2, Araada room: International Workshop on Artificial Intelligence for Cybersecurity (AICS'22) Chair: Sanaa Kaddoura, Zayed University, UAE</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Nadia Dahmani, <i>Welcome Wagons: A Blockchain based Web Application for Car Booking</i> - Heba Ismail, <i>Water Quality Classification Using Machine Learning Algorithms</i> - Abdella Battou, <i>Network Security Traffic Analysis Platform - Design and Validation</i> - Heba Ismail, <i>Smart Residential Water Leak and Overuse Detection System Using Machine Learning</i> <p>Workshop 3, Liwa Arena room: The Federated Systems & Testbeds Workshop on 5G and Beyond (FSW5G 2022) Chair: Hisham Kholidy, State University of New York, USA</p> <p>Keynote: Mamadou Diallo, ONR Global in London.</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Akshit Aggarwal, <i>Blind Two Party ECDSA Signing Based Homomorphic Encryption over Message Passing</i> - Hisham A. Kholidy, <i>Toward An Experimental Federated 6G Testbed: A Federated Learning Approach</i> <p>Symposium, Gatoof room: Symposium of Computing, Informatics, Multimedia, and Networking (CIMN) Chair: Nadia Kabachi, University Lyon 1, France</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Sameh Kchaou, <i>Bottom-up approach to translate Tunisian dialect texts in Social Networks</i> - Oratile Leteane, <i>An adaptive and extensible framework to enhance end to end trustworthiness of traceability data</i> - Hasnae Zerouaoui, <i>Neuro-fuzzy ensembles: A systematic mapping study</i> - Hasnae Zerouaoui, <i>Histological breast cancer classification using CNN and MLP based ensembles</i> - Faten Khemakhem, <i>A Novel Deep Multi-Task Learning to Sensing Student Engagement in E-Learning Environments</i>

15.30-16.00	Coffee break
16.00-17.30 (concurrent sessions)	<p>Symposium, Gatoof room: Symposium of Computing, Informatics, Multimedia, and Networking (CIMN) Chair: Nadia Kabachi, University Lyon 1, France, France</p> <p>Presenters, Titles</p> <ul style="list-style-type: none"> - Marco De Vincenzi, <i>DRIVES: Android App for Automotive Customized Services</i> - Amra Sghaier, <i>Comparative Study of QoS-aware Network Coding Protocols in WSNs</i> - Walid Fakhet, <i>Guided classification for Arabic Characters handwritten Recognition</i> - Lucas Francisco, <i>A Study on the Application of Blockchain in Carbon Trading Systems</i> - Gahangir Hossain, <i>A New Algorithm for Energy Efficient Task Scheduling in Green Cloud Computing</i>
16.00-17.30 (concurrent sessions)	<p>Track 6, Araada room: Multimedia, Computer Vision, and Image Processing Chair: Elhadj Benkhelifa, Staffordshire University, UK</p> <p>Presenters, Titles</p> <ul style="list-style-type: none"> - Kamel Madi, <i>3D Deformable Protein Shapes Classification based on Triangles-Stars and Composite Deep Neural Networks</i> - Ali Akoglu, <i>GPGPU-based High Throughput Image Pre-processing Towards Large-Scale Optical Character Recognition</i> - Raoudha Nouisser, <i>Deep Learning and Kinect Skeleton-based Approach for Fall Prediction of Elderly Physically Disabled</i>
18.00-20.00	Cocktail Reception & Local Entertainment

December 6, 2022 - Tuesday	
10:00-11:00	Liwa Arena room Keynote speaker 2: Hoda H Alkhzaimi, New York University Abu Dhabi Topic: Designing for the future of cryptographic hardware security Chair: Rima Grati, Zayed University, UAE
11:00-11:30	Coffee break
11:30-13:00 (concurrent sessions)	<p>Track 1, Gatoof room: Ubiquitous, Parallel and Distributed Computing (including cloud, IoT, network, sensors, blockchain technologies)</p> <p>Chairs</p> <ul style="list-style-type: none"> - Khouloud Boukadi, Faculty of Economics and Management of Sfax, Tunisia - Sami Yangui, INSA Toulouse, France <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Faiza Loukil, <i>Early Detection of Diabetes > Mellitus Using Differentially Private SGD in Federated Learning</i> - Hassan Idoudi, <i>Vehicular Cloud Computing for Population Evacuation Optimization</i> - Afef Mdhaffar, <i>A Smart Trap for Counting Olive Moths Based on the Internet of Things and Deep Learning</i>
	<p>Track 2, Aradaa room: Security, Privacy, and Trust</p> <p>Chairs:</p> <ul style="list-style-type: none"> - Gianpiero Costantino, Italian National Research Council - Ilaria Matteucci, Italian National Research Council <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Sajjad Khan & Anton Wahrstaetter, <i>Modeling User-Centric Threats in Smart City: A Hybrid Threat Modeling Method</i> - Asma Cherif, <i>Towards an intelligent adaptive authentication framework for preventing and detecting credit card fraud</i>
	<p>Track 3, Liwa Arena room: Data Science, knowledge engineering, and ontologies (including Information Retrieval, Big Data, Databases, and Knowledge Systems)</p> <p>Chair: Mohamed Reda Bouadjeneq, Deakin University, Australia</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Alejandro Adorjan, <i>Towards a human-in-the-loop curation: A qualitative perspective</i> - Abdallah Makhoul, <i>Strategic Attacks on Recommender Systems: An Obfuscation Scenario</i> - Stefan Nestic, <i>streamRHF: Tree-Based Unsupervised Anomaly Detection for Data Streams</i> - Hanene Ben-Abdallah, <i>Clustering techniques for software product line feature identification</i>
Lunch (Liwa Arena room)	
14:00-15:30 (concurrent sessions)	<p>Track 1, Gatoof room: Ubiquitous, Parallel and Distributed Computing (including cloud, IoT, network, sensors, blockchain technologies)</p> <p>Chairs:</p> <ul style="list-style-type: none"> - Khouloud Boukadi, Faculty of Economics and Management of Sfax, Tunisia - Sami Yangui, INSA Toulouse, France <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Helen Karatza, <i>Resource Allocation and Scheduling of Linear Workflow Applications with Ageing Priorities and Transient Failures</i> - Chekra El Fehri, <i>The cost of reliable uplink communication in large scale LoRaWAN</i> - Jaeyoung Choi & Yoonhee Kim, <i>Optimization of Matrix–Matrix Multiplication Algorithm for Matrix–Panel Multiplication on Intel KNL</i> - Faiza Loukil, <i>BELONG: Blockchain basEd pLatform fOr donation & social project fuNdinG</i>

	<p>Track 4, Araada room: Artificial Intelligence & Cognitive Systems Chair: Sunil Aryal, Deakin University Australia</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Berrouachedi Abdelkader, <i>Convolutional, Extra-Trees and Multi layer Perceptron</i> - Sven Loeffler, <i>Optimal Beacon Placement for Indoor Positioning Using Constraint Programming</i> - Kadhim Hayawi, <i>On the Impact of Deep Learning and Feature Extraction for Arabic Audio Classification and Speaker Identification</i> - Hadjer Ykhlef, <i>Time Series Fault Detection for Power Line Condition Monitoring: A Comparative Study</i> - Asma Cherif, <i>Machine Learning Models for Early Prediction of Asthma Attacks Based on Bio-signals and Environmental Triggers</i>
19.00-23.00	Gala Dinner

December 7, 2022 - Wednesday

<p align="center">9:30-11:00</p>	<p align="center">Liwa Arena room</p> <p>Keynote speaker 3: Fakhri Karray, Mohamed bin Zayed University of Artificial Intelligence, University of Waterloo Topic: Advances in Operational Artificial Intelligence: Promises and Challenges</p> <p>Keynote speaker 4: Athena Vakali, Aristotle University of Thessaloniki, Greece Topic: Online Self-trails and Sensing Data Analytics</p> <p>Chair: Chirine Ghedira Guegan, IAE, U. Jean Moulin, Lyon 3, France</p>
<p align="center">11:00-11:30</p>	<p align="center">Coffee break</p>
<p align="center">11:30-13:00</p>	<p>Women in STEM, Liwa Arena room Panel list:</p> <ul style="list-style-type: none"> - May AlTae, Emirates College for Advanced Education - Boran AlTal, Google Cloud - Athena Vakali, Aristotle University of Thessaloniki, Greece - Hajar Baazaoui, ENSEA, France <p>Chairs:</p> <ul style="list-style-type: none"> - Chirine Ghedira Guegan, IAE, U. Jean Moulin, Lyon 3, France - Geneveva Vargas-Solar, CNRS, France <p>Panel: <i>What is the participation rate of women in promising trends like data science, artificial intelligence or blockchain? Are women really getting their part of the pie?</i></p>
<p align="center">Lunch (Liwa Arena room)</p>	
<p align="center">14:00-15:30 (concurrent sessions)</p>	<p>Track 4, Gatoof room: Artificial Intelligence & Cognitive Systems Chair: Sunil Aryal, Deakin University Australia</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Kai Widdeson, <i>FFM-SVD: A Novel Approach for Personality-aware Recommender Systems</i> - Ismehene Chahbi, <i>Towards an efficient and interpretable Machine Learning approach for Energy Prediction in Industrial Buildings: A case study in the Steel Industry</i> - Salim Hariri, <i>AI-based Arabic Language and Speech Tutor</i> - Khoulood Boukadi, <i>Towards an Accurate Stacked Ensemble Learning Model for Thyroid Earlier Detection</i> <p>Track 5, Aradaa room: Natural Language Processing Chair: Ali Jaoua, Oryx universal college Qatar, in partnership with LJMU, UK</p> <p><u>Presenters, Titles</u></p> <ul style="list-style-type: none"> - Bilel Elayeb, <i>Socio-Semantic Information Retrieval of Structured Arabic Texts</i> - Mabrouka Besghaier, <i>Natural Language Inference for Arabic using Recurrent Neural Network and Word Embedding</i> - Salim Hariri, <i>A BERT-based Deep Learning Approach for Reputation Analysis in Social Media</i> - Dhrubajyoti Pathak, <i>AsPOS: Assamese Parts-of-Speech Tagger using Deep Learning Approach</i>

Track 6, Liwa Arena room: Multimedia, Computer Vision, and Image Processing

Chair: Elhadj Benkhelifa, Staffordshire University, UK

Presenters, Titles

- Md Faraz Kabir Khan, *Book Cover Synthesis from the Summary*

- Fatima Al Rammah, *CNN-LSTM Based Approach for Analyzing and Detecting Stereotypical Motor Movements of Autistic Children in Pre-Meltdown Crisis*

- MD Shafiur Rahman, *Shapes2Toon: Generating Cartoon Characters from Simple Geometric Shapes*

15:30-16:00

Closing Ceremony